Patent Application

for

METHOD AND SYSTEM FOR RECORDING AUXILIARY AUDIO OR VIDEO SIGNALS, SYNCHRONIZING THE AUXILIARY SIGNAL WITH A TELEVISION SIGNAL, AND TRANSMITTING THE AUXILIARY SIGNAL OVER A TELECOMMUNICATIONS NETWORK

By

David L. Turock
Richard A. Robbins
Warren S. Gifford

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BACKGROUND OF THE INVENTION

When a television signal is recorded or broadcast, it typically includes a video signal with a synchronized audio signal "attached" to it. In many cases it is desirable for a person to view the video but to be able to listen to a different audio signal. For example, the person may not speak the language of the attached audio signal, the person may be sight impaired and need a more descriptive audio interpretation, or the language in the attached audio signal may offend the person. The person may desire to see the video essentially when it is delivered or broadcast, for example, with live news coverage or a sporting event, so that they can discuss it with their friends, perhaps even in the same room.

SUMMARY OF THE INVENTION

The present invention includes a method and system for recording an auxiliary signal, synchronizing the auxiliary signal with a video signal, and transmitting the auxiliary signal over a telecommunications network.

The method includes receiving a video signal and generating an auxiliary signal derived at least in part from the video signal. The auxiliary signal is transmitted over a telecommunications network and the video signal is delayed as a function of the auxiliary signal. The auxiliary signal and video signal are synchronized.

To accomplish this method, a system is used which includes at least one video signal receiver, an auxiliary signal recorder, at least two

telecommunications network interfaces, a signal comparator, and video signal buffer.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic illustration of a first embodiment of the method of the invention.

Figure 2 is a schematic illustration of a second embodiment of the method of the invention.

Figure 3 is a schematic illustration of an implementation of the methods of the invention.

DETAILED DESCRIPTION

A first embodiment **100** of the method of the invention is schematically illustrated in Figure 1. The first embodiment begins with Existing Video Signal **110**. This signal is distributed to both New Synchronized Signal Generation Process **120**, and Playback Process **130**. In addition, the New Synchronized Signal Generation Process **120** creates New Synchronized Signal **140**, which is distributed to the Playback Process **130**. This embodiment applies when the playback process has access to the existing video signal at essentially the same time as the new signal generation process, for example if the existing video signal is broadcast or available on a common transmission system, such as a cable TV.

A second embodiment **200** of the method of the invention, schematically illustrated in Figure 2, applies if the playback process does not have access to the existing video signal at essentially the same time as the new signal generation process. For example, the transmission mechanisms may be

different for the two processes, or the playback process may not have access to the existing signal directly. The second embodiment also begins with an Existing Video Signal **210**. This signal is distributed to the New Synchronized Signal Generation Process **220**. The New Synchronized Signal Generation Process **220** creates Synchronized Combined Signal **240**, which is distributed to the Playback Process **230**. This signal may be in a different format from the original video signal, for example, due to different transmission media, or different technology, or to being stored and transmitted in non-real time.

The Existing Video Signal **110, 210** can be in any format, including, for example, the variety of commonly used video formats, or newly developing formats. The method can work with any video signal, any combined video and audio signal, and other formats that include video and possibly other information, such as text in a multi-media format. The signal can be "broadcast" or local, live, or recorded.

In accordance with the New Synchronized Signal Generation Process **120, 220** of the current invention, many methods of creating a new audio, and/or another other signal, to be synchronized with the video, are contemplated. One class of methods relies solely on the Existing Video Signal **110, 210**. For example, a person, or even a computer, could monitor the existing video and record a new audio signal as they are monitoring. It is optional whether the combined audio signal, if it exists, is used.

Monitoring the audio signal may be required in the case of a translation of a speech which is carried in the existing video and audio signal, but may be extraneous if a completely different interpretation is being created, such as for the visually disabled.

Another class of methods may use additional information that may be available, such as a prepared text or other multi-media information available either separately from the video signal or combined with it in some way. These methods may include an automated process for generating an auxiliary signal designed to translate speech, synthesize speech if there is a prepared text, or describe the situation depicted in the video signal.

A key feature of these processes is that the generation of the synchronized signal may require that the video be paused for an interval or the viewing otherwise delayed. For example, the person or process generating the new information may need more time to describe the situation, to complete the translation, or to look up information.

Another feature is that portions of the existing video may be omitted, or otherwise processed, such as freeze-frame or slow motion, to permit better description or to omit offensive portions of the video signal. The new information signal is then marked with time stamps to correspond to the original video signal timing, and to provide the control information for playback of the video signal.

Multiple audio signals may be simultaneously prepared, for example different languages, and other information can be provided as well, including text, image, other video, etc. These can be synchronized with the original video.

The output of the New Synchronized Signal Generation Process **120, 220** depends on whether the Playback Process **130, 230** is receiving the Existing Video Signal **110, 210** in nearly real time with the New Synchronized Signal Generation Process **120, 220**.

In the first embodiment, the Existing Video Signal **110** is available to the Playback Process **130** directly. The New Synchronized Signal **140** need only contain the new information, the synchronizing information, and any playback control information, for proper playback.

In the second embodiment, the Existing Video Signal **210** is not directly the available to the Playback Process **230**. The New Signal **240**, containing the new information as well as synchronizing and playback control information, can be either (1) combined with a representation of the existing video signal for distribution to the Playback Process **230**, or (2) a video and audio delivery format can be used and sent separately over the telecommunications network.

The Playback Process **130, 230** takes the inputs and generates a combined experience for the viewer. The viewer should see a fully synchronized signal with the audio and other descriptions corresponding to the video.

In the first embodiment **100**, the Playback Process **130** has the ability to buffer the video and audio, and other signals, independently so that they can be synchronized and to execute the commands specified in the New Synchronized Signal Generation Process **120.** The Playback Process **130** can run on a PC or other device that synchronizes the audio and video and other signals, and executes the specified commands. In the second embodiment, the Synchronized Combined Signal **140** can be either a combined video and audio signal, for example, a conventional television format, or it can be the same information as the New Synchronized Signal **240** plus a video signal in any format. In the former case, the Playback Process **230** can simply be any compatible video and audio display system, for example, a TV set. In the latter case, the same functions are required in the Playback Process **230** as in the

first embodiment **100**. The viewer will also have control over the playing of the combined and individual signals, for example, pause and replay.

There may be several synchronized audio signals to choose from, for example, different languages. There may be other types of signals provided, such as text, images and other video signals that the viewer can select and control. The viewer may have a convenient, easy-to-use interface to control the playback and to select the various options and operate the controls. The system may interface with standard video and audio displays and recording systems.

The New Synchronized Signal **140** may include an audio signal, a set of time stamps or other signals to allow the playback process to synchronize the audio and other signals with the video, control signals to instruct the Playback process in how to act on the other signals, or other types of information, such as text, graphics, images, or other video. The signal **140** is sent as a combined package of information so that the Playback Process **130** can receive it, decode the various components, synchronize with the Existing Video Signal **110**, and carry out the functions as specified in the New Synchronized Signal Generation Process **120**.

The Synchronized Combined Signal **240** contains the same functional information as the New Synchronized Signal **140**, but in addition includes the video signal itself, although possibly in a different format from the original video signal. The combined signal **240** may be delivered in a conventional video format so that it can be played on any compatible audio and video system. The advantage is the ability to use existing standards and media and receiving and display devices.

A schematic illustration of an implementation of the methods of the invention is shown in Figure 3. There are many different systems, devices, and configurations that can be used to implement the proposed method. The system of this implementation includes a standard TV signal **310** sent over a commercial coaxial cable. This TV signal **310** is delivered to two Personal Computer ("PC") systems **330, 350**. Each PC system **330, 350** is equipped with a video signal receiver **331, 351** and an Internet interface **332, 352**. The two PC Systems **330, 350** are connected together over the Internet **340**.

PC system **330** takes the incoming TV signal **310** and derives **333** a synchronizing signal **334** that can specify a precise instant in the TV signal time stream, namely the clock time associated with receipt of the video signal. PC system **330** displays the TV signal **310** on a portion of its monitor **335**. A human editor **320** views this TV signal **310** and records a new audio signal **380** to be synchronized with the TV signal. The human editor **320** can control the time stamps on the new audio signal, for example delaying the clock time to give the human editor **320** time to think. Thus, the new audio signal may cause the video to be delayed from actual clock time in playback time. This new audio signal **380** as well as the synchronizing signal **334** is coded **336** and transmitted **370** over the Internet **390** to PC system **350**.

PC system **350** receives the TV signal **310** and derives **353** clock time signal **357** from it. PC system **350** also receives the combined signal **370** including synchronizing signal **334** and linked new audio signal **380** over the Internet connection **352** from PC system **330**. PC system **350** now compares **354** the two time-stamp signals **334, 357** and buffers **355** the incoming TV signal so that it matches the synchronizing timing signal **334** coming over the

Internet connection **352**. PC system **350** then displays **356** to the viewer **360** the delayed TV signal **359** synchronized with the new audio signal **380**. Thus the viewer **360** perceives that the TV signal has the new audio signal seamlessly integrated with it.

This implementation also provides many other capabilities. The human editor **320**, who can actually be more than one person, may control the display of the TV signal. For example, the video signal may be paused for a specified period of time, viewed in slow motion, or speeded up. These effects are then replicated by PC system **350** so that human viewer **360** perceives the video and audio signals as directed by the human editor. Similarly, human viewer **350** may control the playback of the signal, much as they would from a VCR or other recorded audio and video source. Thus, human viewer **360** may pause, speed up, slowdown, or replay the derived audio and video signal. More advanced capabilities can also be provided, such as zooming in or out on the video image, special effects, such as transitions from one image to another, and myriad other capabilities which are becoming available in video playback systems and on personal computers. Human editor **360** can also add an additional video or other signals **380**, for example, an image of the human editor **320**. A signal containing this additional information **370** is transmitted over the Internet connection **340** to PC system **350**. Additional information and control information, such as music, subtitles, text, still images, other audio and video, etc. can also be added and synchronized. A further extension is to allow two or more TV signals to be combined and otherwise controlled by the human editor during preparation of new information, and by the human viewer during playback. Thus this implementation, and more generally the method, can take

one or more existing media and create a variety of new media from this under the control of both the human editor and human viewer.

It will be understood that the above-described embodiments are merely illustrative of the principles of the invention and that other arrangements may be devised by those skilled in the art without departing from the spirit and scope of the invention.